

1. Identification

- A. Product name : EPOXY TOPCOAT CLEANPOXY 3100 P/BASE
- B. Recommended Use and Restriction on Use
- General use : solvent epoxy coating
 - Restriction on use : Restricted to use other than recommended use
- C. Manufacturer / Supplier / distributor information
- Company name : NOROO Paint & Coatings Co., Ltd.
 - Address : 351, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, Korea
 - Emergency telephone number : +82-31-467-6114

2. Hazard identification

- A. GHS Classification
- Acute toxicity (inhalation: gas) Category 3
 - Carcinogenicity Category 2
 - Reproductive toxicity Category 1A
 - Flammable liquids Category 2
 - Serious eye damage/irritation Category 2A
 - Specific target organ toxicity(Single exposure) Category 3
 - Specific target organ toxicity(Repeated exposure) Category 1
 - Skin corrosion/irritation Category 2
 - Aspiration hazard Category 2
 - Specific target organ toxicity(Single exposure) Category 1
 - Ozone layer hazard
- B. GHS label elements
- Hazard symbols
-
- Signal words : DANGER
 - Hazard statements :
- H331 Toxic if inhaled
 - H351 Suspected of causing cancer
 - H360 May damage fertility or the unborn child
 - H225 Highly flammable liquid and vapour
 - H319 Causes serious eye irritation
 - H335+H336 May cause respiratory irritation. May cause drowsiness and dizziness.
 - H372 Prolonged or repeated exposure may cause lung damage to the body (Refer Section SDS 11)
 - H315 Causes skin irritation
 - H305 May be harmful if swallowed and enters airways
 - H370 Causes damage to organs: central nervous system (CNS), gastrointestinal tract(Refer Section SDS 11)
 - H420 It destroys the upper layer of the ozone layer and is harmful to public health and environment.
- Precautionary statements
- Prevention
 - P240 Ground/bond container and receiving equipment.
 - P241 Use explosion-proof electrical/ventilating/lighting/equipment.
 - P242 Use only non-sparking tools. Flammable liquids (chapter 2.6) 1, 2, 3
 - P243 Take precautionary measures against static discharge.
 - P280 Wear protective gloves/protective clothing/eye protection/face protection.
 - P261 Do not breathe dust/fume/gas/mist/vapours/spray.
 - P271 Use only outdoors or in a well-ventilated area.
 - P201 Obtain special instructions before use.
 - P202 Do not handle until all safety precautions have been read and understood.
 - P281 Use personal protective equipment as required.
 - P210 Keep away from heat/sparks/open flames/hot surfaces. ? No smoking.
 - P264 Wash hands thoroughly after handling.
 - P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 - P260 Do not breathe dust/fume/gas/mist/vapours/spray.
 - P270 Do not eat, drink or smoke when using this product.
 - P233 Keep container tightly closed.
 - Response
 - P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 - P311 Call a POISON CENTER or doctor/physician.
 - P321 Specific treatment
 - P308+P313 If exposed or concerned: Get medical advice/attention.
 - P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
 - P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 If eye irritation persists: Get medical advice/attention.
 P312 Call a POISON CENTER or doctor/physician if you feel unwell.
 P314 Get medical advice/attention if you feel unwell.
 P302+P352 IF ON SKIN: Wash with plenty of soap and water.
 P332+P313 If skin irritation occurs: Get medical advice/attention.
 P362 Take off contaminated clothing and wash before reuse.
 P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 P331 Do NOT induce vomiting.
 P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section MSDS 5).
 P307+P311 If exposed: Call a POISON CENTER or doctor/physician.

- Storage

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
 P405 Store locked up.
 P403+P235 Store in a well-ventilated place. Keep cool.

- Disposal

P501 Dispose of contents/container in accordance with local/regional/national/international regulation
 P502 Please refer to the information provided by the manufacturer / supplier on recycling and recycling examples.

C. Other hazards which do not result in classification : (NFPA Classification)

Chemical Name	NFPA grade	Health	Flammability	Reactivity
4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]		2	1	0
Titanium dioxide		1	0	0
Limestone		1	0	0
Xylene		NO DATA	NO DATA	NO DATA
Dimethyl carbonate		1	3	1
S1(Trade secrets)		3	1	0
4-Methyl-2-pentanone		1	3	0
Propylene glycol methyl ether acetate		1	2	0
Solvent naphtha (petroleum), light arom.		1	2	0
Ethylbenzene		2	3	0
Methanol		1	3	0
2-Butoxyethanol		3	2	0
Kaolin		1	0	0

3. Composition/information on ingredients

Chemical Name	Trade names and Synonyms	CAS-NO	Content (%)
4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]	4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]	25036-25-3	21~31
Titanium dioxide	Titanium dioxide	13463-67-7	17~27
Limestone	Limestone	1317-65-3	12~22
Xylene	Xylene	1330-20-7	12~22
Dimethyl carbonate	Dimethyl carbonate	616-38-6	1~10
S1(Trade secrets)	-	-	1~10
4-Methyl-2-pentanone	4-Methyl-2-pentanone	108-10-1	1~10
Propylene glycol methyl ether acetate	Propylene glycol methyl ether acetate	108-65-6	1~10
Solvent naphtha (petroleum), light arom.	Solvent naphtha (petroleum), light arom.	64742-95-6	1~10
Ethylbenzene	Ethylbenzene	100-41-4	1~10
Methanol	Methanol	67-56-1	1~10
2-Butoxyethanol	2-Butoxyethanol	111-76-2	1~10
Kaolin	Kaolin	1332-58-7	1~10

4. First-aid measures

A. Eye Contact : If irritation, pain, swelling, tears or glaring happens, take medical assistant immediately Flush exposed eyes with plenty of water for more than 15minutes.

B. Skin Contact : Wash off with soap and water for more than 15 minutes. And take medical assistant immediately. If symptoms like irritation or pain occurs, take medical assistant immediately. Remove exposed clothing, and wash off exposed area with soap and water.

C. Inhalation : Take a medical assistant immediately. Remove contaminated clothing and shoes, and isolate it. If hard to breathe, administering oxygen Perform the artificial respiration, using the pocket mask with one way valves or other respiratory medical devices. If inhaled or swallowed, do not perform the inhalation phase of breathing If not breathing, perform the artificial respiration. Avoid from exposure, and move into an area with fresh air.

D. Ingestion Contact : It is need to be considered that early removal of some ingested material by gastric lavage must be weighed against potential complications of bleeding or perforation Take proper medical assistant by symtoms. If ingested large quantity, take medical assistant. Do not try to induce vomiting, if occurs, keep head below hips to prevent swallow into lungs. Inducing vomit.

E. Notes to Physician : There is no specific antidote and take an appropriate medical treatment.

5. Fire-fighting measures

- A. Suitable (Unsuitable) extinguishing media
- Suitable extinguishing media : Powder extinguishing agent, gaseous Extinguishing Agent, and regular foam.
 - (Unsuitable) extinguishing media : Water is not appropriate extinguishing agent
 - Case of big fire : Use appropriate protective device depend on the situation. Stay away more than 800m to avoid tank explosion. Spread large amount of the extinguishing agent as a mist form with staying against wind.
- B. Specific hazards arising from the chemical
- Pyrolysate : Carbon dioxide, toxic carbon compounds/Nitrogen compounds/sulfur compounds
 - Fire and Explosion danger : Risk of medium-sized fire.
- C. Special protective actions for fire-fighters
- Personal Precautions, protective equipment : Gas mask or air respirator, heat resistant clothing, heat resistant helmet, heat resistant gloves, heat resistant boots
 - Emergency procedures : Block the area except for the fire-suppression personnel. Cooling containers with water long time after extinguish fire. If there is no risk, moving containers away from fire. Use appropriate extinguishing agents to catch fire.

6. Accidental release measures

- A. Personal Precautions, protective equipment and emergency procedures
- Personal Precautions, protective equipment : Gas mask for organic gases, other appropriate protective device / clothing / gloves.
 - Emergency procedures : Do not contact on the bare skin Do work with the personal protected devices such as gas mask for organic gases other appropriate protective devices / clothing / gloves. Spray water to reduce amount of steam. Take an action to block the leakage if there is no risk.
- B. Environmental precautions
- Atmosphere : Using local ventilation to Minimize the exposure to worker. Do install the local ventilations and full ventilation system
 - Soil : Use absorbent to collect the appropriate container. Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers.
 - Under water : Collect spilled material with mechanic devices Use absorbent to collect the appropriate container.
- C. Methods and materials for containment and cleaning up
- Small spill : Move to appropriate container for disposal of spilled material collected. Absorb for use sand or other non-combustible material.
 - Large spill : Notify to central and local government, when emissions are above regulation. Prohibit access of unnecessary people, isolate hazard area to secure.

7. Handling and storage

- A. Precautions for safe handling : Use local ventilations and a full ventilation system when handling Seal the container for minimizing the petroleum steam Ground for preventing the static discharge Keep or handle followed by Dangerous goods Safety Management Act
- B. Conditions for safe storage, including any incompatibilities : Stored in an isolated place, freezing caution, high temperature body caution. Avoid strong oxidizing agents, acid. Storage temperature: 5 ~ 35 °C Avoid direct sunlight while storing outdoor. Because of evaporation and contamination concerns, airtight the container and store in a well-ventilated building.

8. Exposure controls/personal protection

- A. Exposure Limits
- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[[1-methylethylidene]bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Titanium dioxide
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Limestone
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Xylene
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Dimethyl carbonate
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - S1 (Trade secrets)
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - 4-Methyl-2-pentanone
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Propylene glycol methyl ether acetate
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Solvent naphtha (petroleum), light arom.

- ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Ethylbenzene
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Methanol
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - 2-Butoxyethanol
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
 - Kaolin
 - ACGIH : NO DATA
 - Biological exposure indices : NO DATA
- B. Engineering Controls :
- ▷ Do install the local ventilations and full ventilation system
 - ▷ Using local ventilation to Minimize the exposure to worker.
 - ▷ NO DATA
 - ▷ NO DATA
- C. Personal Protective Equipment
- Respiratory protection : Use the personal protect respirator for organic solvent or higher level of capacity when workers are supposed to be exposed under unsuitable respiratory working condition, or longer period exposure than standard level. Respirators should be authorized by Korea Occupational Safety and Health Agency
 - Eye protection : Let workers do wear the safety glasses in case hazard caused by mist may be expected. Install washing facilities and an emergency washing facilities close to workplace. Use the respirator for organic solvent or higher level.
 - Hand protection : Wear the chemical protective gloves Do the workers wear the impermeable protective gloves made from rubber/PVC due to skin irritation may be supposed by chronicle and long period exposure.
 - Skin protection : Wear appropriate chemical protective clothing. Work after wearing the impermeable protective apron made by rubber/PVC in case hazard caused by exposure or spill, wear the impermeable whole body protective clothing if needed.

9. Physical and chemical properties

- A. Appearance : liquid
- B. Odor : solvent odor
- C. Odor threshold : NO DATA
- D. PH : NO DATA
- E. Melting point/Freezing point(°C) : NO DATA
- F. Initial Boiling Point/Boiling Ranges(°C) : NO DATA
- G. Flash point(°C) : 20
- H. Evaporating Rate : NO DATA
- I. Flammability(solid, gas)(°C) : NON Flammable
- J. Upper/Lower Flammability or explosive limits : NO DATA
- K. Vapour pressure : NO DATA
- L. Solubility : water insoluble
- M. Vapour density : NO DATA
- N. Specific gravity : 1.31
- O. Partition coefficient of n-octanol/water : NO DATA
- P. Autoignition temperature(°C) : NO DATA
- Q. Decomposition temperature(°C) : NO DATA
- R. Viscosity : 64~74(KU/25°C)
- S. Molecular weight : NO DATA

10. Stability and reactivity

- A. Chemical stability : NO DATA
- B. Possibility of hazardous reactions : Avoid contaminants and friction Do not contact with heat, spark, flame or other flammable sources
- C. Conditions to avoid : Oxidation agent, metal and combustable materials
- D. Hazardous decomposition products : Thermal decomposition products (carbon etc..)

11. Toxicological information

- A. Information on the likely routes of exposure
 - Respiratory tracts : Adverse lung effects, Dyspnoea, Hypothermia, Vomitting

- Oral : Vomiting, Diarrhea, Stomach pain, Irregular heartbeat
 - Skin : Irritation, Burn, Adverse nerve effects
 - Eye : Irritation, eye damage
- B. Delayed and immediate effects and also chronic effects from short and long term exposure
- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - Acute toxicity
 - Oral : LD50 > 2000 mg/kg Rat
 - Dermal : LD50 > 2000 mg/kg Rabbit
 - Inhalation : LD50 > 2000 mg/kg Rabbit
 - Skin corrosion/irritation : NO DATA
 - Serious eye damage/irritation : NO DATA
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : NO DATA
 - Reproductive toxicity : NO DATA
 - STOT-single exposure : NO DATA
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : NO DATA
 - Titanium dioxide
 - Acute toxicity
 - Oral : LD50 > 10000 mg/kg Rat
 - Dermal : LD50 > 10000 mg/kg Rabbit
 - Inhalation : LD50 > 10000 mg/kg Rabbit
 - Skin corrosion/irritation : (in rabbit) skin Irritation test result weak Irritation or non-irritating
 - Serious eye damage/irritation : Using the rabbit eye irritation test results - Mild irritant
 - Respiratory sensitization : NO DATA
 - Skin sensitization : negative patch test results in people
 - Carcinogenicity
 - IARC : Group 2B
 - OSHA : NO DATA
 - ACGIH : A4
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : Mouse Micronucleustest Negative, Mouse Chromosomal abnormalitiestest Negative
 - Reproductive toxicity : Mouse Micronucleustest Negative, Mouse Chromosomal abnormalitiestest Negative
 - STOT-single exposure : NO DATA
 - STOT-repeated exposure : Reported occupational pneumoconiosis in the exposed workers for more than 20 years.
 - Aspiration hazard : NO DATA
 - Limestone
 - Acute toxicity
 - Oral : NO DATA
 - Dermal : NO DATA
 - Inhalation : NO DATA
 - Skin corrosion/irritation : NO DATA
 - Serious eye damage/irritation : NO DATA
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : NO DATA
 - Reproductive toxicity : NO DATA
 - STOT-single exposure : NO DATA
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : NO DATA
 - Xylene
 - Acute toxicity
 - Oral : LD50=3550 mg/kg rat
 - Dermal : LD50 4350 mg/kg Rabbit
 - Inhalation : LD50 4350 mg/kg Rabbit
 - Skin corrosion/irritation : Skin irritation test in rabbits Causes moderate irritation.
 - Serious eye damage/irritation : Skin irritation test in rabbits Causes moderate irritation.
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : Group 3
 - OSHA : NO DATA
 - ACGIH : A4
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : If three people a voice dynamics, somatic cell mutagenicity tests in vivo

- (micronucleus test, chromosome test) Voice
 - Reproductive toxicity : If three people a voice dynamics, somatic cell mutagenicity tests in vivo (micronucleus test, chromosome test) Voice
 - STOT-single exposure : NO DATA
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : In the liquid can cause chemical pneumonia if swallowed.
- Dimethyl carbonate
 - Acute toxicity
 - Oral : LD50 = 13000 mg/kg Rat
 - Dermal : LD50 = 5000 mg/kg Rabbit
 - Inhalation : LD50 = 5000 mg/kg Rabbit
 - Skin corrosion/irritation : non-irritating(rabbit)
 - Serious eye damage/irritation : Mild irritant(rabbit)
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : NO DATA
 - Reproductive toxicity : NO DATA
 - STOT-single exposure : NO DATA
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : NO DATA
- S1 (Trade secrets)
 - Acute toxicity
 - Oral : NO DATA
 - Dermal : NO DATA
 - Inhalation : NO DATA
 - Skin corrosion/irritation : Causes of skin stimulus
 - Serious eye damage/irritation : Causes eye irritation
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : NO DATA
 - Reproductive toxicity : NO DATA
 - STOT-single exposure : Inhalation airway irritation
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : NO DATA
- 4-Methyl-2-pentanone
 - Acute toxicity
 - Oral : LD50 = 2080 mg/kg Rat
 - Dermal : LD50 = 3000 mg/kg rabbit
 - Inhalation : LD50 = 3000 mg/kg rabbit
 - Skin corrosion/irritation : Using the rabbit and guinea pig Causes testresult weak stimulus
 - Serious eye damage/irritation : Non-irritating
 - Respiratory sensitization : NO DATA
 - Skin sensitization : negative test results using guinea pig
 - Carcinogenicity
 - IARC : Group 2B
 - OSHA : NO DATA
 - ACGIH : A3
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : Using mammalian erythrocytes Micronucleustest Negative
 - Reproductive toxicity : Rats were pregnant and inhalation toxicity test using mice results in decreased fetal body weight dose appears to be toxic to mother animals or the delayed ossification was seen was not teratogenic, reproductive toxicity have not been reported in humans
 - STOT-single exposure : Person, in prayer mucosal irritation, headache, dizziness, vomiting and other symptoms of central nervous system acting anesthetic appears to involve. Narcotic effects in animal experiments appears.
 - STOT-repeated exposure : It appears symptoms of exhaustion, feeling, headache, heartburn, stomach pain, vomiting, sore throat, etc. In the eyes of the people.
 - Aspiration hazard : NO DATA
- Propylene glycol methyl ether acetate
 - Acute toxicity
 - Oral : LD50 = 8532 mg/kg Rat
 - Dermal : LD50 > 5000 mg/kg Rabbit
 - Inhalation : LD50 > 5000 mg/kg Rabbit
 - Skin corrosion/irritation : rabbit: non-Irritation
 - Serious eye damage/irritation : Rabbit: mild irritant
 - Respiratory sensitization : NO DATA
 - Skin sensitization : Guinea pig / maximization test (GLP): No sensitization
 - Carcinogenicity
 - IARC : NO DATA

- OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : In vitro - Salmonella typhimurium/TA98, TA100, TA1535, TA1537 (ames test, GLP): With and without metabolic activation system- Negative, CHL Cells/Chromosomal abnormalitiestest (GLP):With and without metabolic activation system- Negative, rat Hepatocyte/UDStest (GLP)
 - Reproductive toxicity : In vitro - Salmonella typhimurium/TA98, TA100, TA1535, TA1537 (Return mutation test, GLP): Negative (negative), CHL Cells / Chromosome aberration test (GLP): Negative (negative), rat hepatocyte / UDS test (GLP) : Negative in the absence of metabolic activation system
 - STOT-single exposure : Reported liver effects in humans. Rat Causes affect the spleen. In mice causes an effect on the central nervous system, and lung. That the anesthetic effect on the animal. Irritating to the prayers of people. (ACGIH, etc.)
 - STOT-repeated exposure : Reported affect the kidneys, liver, central nervous system in humans. (PATTY 5th)
 - Aspiration hazard : NO DATA
- Solvent naphtha (petroleum), light arom.
 - Acute toxicity
 - Oral : LD50 = 8400 mg/kg Rat
 - Dermal : LD50 > 2000 mg/kg Rabbit
 - Inhalation : LD50 > 2000 mg/kg Rabbit
 - Skin corrosion/irritation : weakstimulus(rabbit)
 - Serious eye damage/irritation : Mild irritant(rabbit)
 - Respiratory sensitization : NO DATA
 - Skin sensitization : Non-sensitizer (Guinea pig)
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : Carc. 1B
 - Germ cell mutagenicity : EU CLP: 1B (case containing less than 0.1% of the benzene in a weight ratio of the material not applied to the present classification)
 - Reproductive toxicity : EU CLP: 1B (case containing less than 0.1% of the benzene in a weight ratio of the material not applied to the present classification)
 - STOT-single exposure : Affecting the central nervous system. Inhalation of high concentrations vapors may cause loss of consciousness.
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : Harmful aspiration concerns
- Ethylbenzene
 - Acute toxicity
 - Oral : LD50 = 3500 mg/kg Rat
 - Dermal : LD50 = 15400 mg/kg Rabbit
 - Inhalation : Steam LC50 = 4000 ppm 4 hr Rat (Equivalent : 17.4 mg/L)
 - Skin corrosion/irritation : skin Irritation test result weak Irritation
 - Serious eye damage/irritation : Rabbit eye irritation test results in a slight conjunctival irritation, recoverable damage.
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : Group 2B
 - OSHA : NO DATA
 - ACGIH : A3
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : Micronucleustest Negative (7)
 - Reproductive toxicity : Micronucleustest Negative (7)
 - STOT-single exposure : It causes central nervous system effects in laboratory animals and airway irritation.
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : Hydrocarbons. Swallowing the liquid by aspiration may cause chemical pneumonia. Ties seongryul 0.74 mm² / s (25 °C)
- Methanol
 - Acute toxicity
 - Oral : LD50 6200 mg/kg Rat
 - Dermal : LD50 15800 mg/kg rabbit
 - Inhalation : LD50 15800 mg/kg rabbit
 - Skin corrosion/irritation : NO DATA
 - Serious eye damage/irritation : The severity of eye irritation and is recognized in experiments with rabbits, people with corneal disorder, conjunctival edema may be robbery EHC 196 (1997) PATTY (4th, 1994).
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : NO DATA
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : Mouse erythrocyte micronucleus test negative
 - Reproductive toxicity : Mouse erythrocyte micronucleus test negative
 - STOT-single exposure : Long-term exposure to low concentrations of methanol in human noticeable symptoms appear impaired on a wide range of eye chronic toxic effects of methanol blindness caused by exposure appear in the result obtained.
 - STOT-repeated exposure : NO DATA

- Aspiration hazard : NO DATA
- 2-Butoxyethanol
 - Acute toxicity
 - Oral : LD50 = 1746 mg/kg Rat
 - Dermal : LD50 = 99 mg/kg Rabbit
 - Inhalation : LD50 = 99 mg/kg Rabbit
 - Skin corrosion/irritation : skin Irritation test result Irritation
 - Serious eye damage/irritation : Using the rabbit eye irritation test results - Severe irritation
 - Respiratory sensitization : NO DATA
 - Skin sensitization : Guinea pig test results negative, human patch test results in negative
 - Carcinogenicity
 - IARC : Group 3
 - OSHA : NO DATA
 - ACGIH : A3
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : (Using mouse and rat bone marrow cells) Micronucleustest Negative.
 - Reproductive toxicity : (Using mouse and rat bone marrow cells) Micronucleustest Negative.
 - STOT-single exposure : Throat irritation in humans are being observed. Appears neurotoxicity tests decreased activity decreased in rats and jerk reaction. Appears inhalation exposure test results suppress the central nervous system in rats and rabbits.
 - STOT-repeated exposure : The toxic effects appear in the blood (red blood cells) by inhalation exposure in animals.
 - Aspiration hazard : NO DATA
- Kaolin
 - Acute toxicity
 - Oral : NO DATA
 - Dermal : NO DATA
 - Inhalation : NO DATA
 - Skin corrosion/irritation : NO DATA
 - Serious eye damage/irritation : NO DATA
 - Respiratory sensitization : NO DATA
 - Skin sensitization : NO DATA
 - Carcinogenicity
 - IARC : NO DATA
 - OSHA : NO DATA
 - ACGIH : A4
 - NTP : NO DATA
 - EU CLP : NO DATA
 - Germ cell mutagenicity : NO DATA
 - Reproductive toxicity : NO DATA
 - STOT-single exposure : NO DATA
 - STOT-repeated exposure : NO DATA
 - Aspiration hazard : NO DATA

12. Ecological information

A. Ecotoxicity

- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - Fish : NO DATA
 - Crustaceans : NO DATA
 - Algae : NO DATA
- Titanium dioxide
 - Fish : NO DATA
 - Crustaceans : EC50 > 1000 mg/ℓ 48 hr
 - Algae : NO DATA
- Limestone
 - Fish : NO DATA
 - Crustaceans : NO DATA
 - Algae : NO DATA
- Xylene
 - Fish : NO DATA
 - Crustaceans : NO DATA
 - Algae : NO DATA
- Dimethyl carbonate
 - Fish : NO DATA
 - Crustaceans : NO DATA
 - Algae : NO DATA
- S1 (Trade secrets)
 - Fish : NO DATA
 - Crustaceans : NO DATA
 - Algae : NO DATA
- 4-Methyl-2-pentanone
 - Fish : LC50 = 540 mg/ℓ 96 hr
 - Crustaceans : EC50 = 170 mg/ℓ 48 hr
 - Algae : NO DATA
- Propylene glycol methyl ether acetate
 - Fish : LC50 ≥ 100 mg/ℓ 96 hr *Oryzias latipes*
 - Crustaceans : EC50 = 373 mg/ℓ 48 hr *Daphnia magna*
 - Algae : EC50 ≥ 1000 mg/ℓ 72 hr *Selenastrum capricornutum*
- Solvent naphtha (petroleum), light arom.

- Fish : LC50 = 9.22 mg/ℓ 96 hr *Oncorhynchus mykiss*
 - Crustaceans : EC50 = 6.14 mg/ℓ 48 hr *Daphnia magna*
 - Algae : EC50 = 19 mg/ℓ 72 hr *Selenastrum capricornutum*
 - Ethylbenzene
 - Fish : LC50 = 9.09 mg/ℓ 96 hr
 - Crustaceans : LC50 = 0.4 mg/ℓ 96 hr
 - Algae : NO DATA
 - Methanol
 - Fish : LC50 15400 mg/ℓ 96 hr *Lepomis macrochirus*
 - Crustaceans : LD50 > 100 mg/ℓ 96 hr *Daphnia magna*
 - Algae : NO DATA
 - 2-Butoxyethanol
 - Fish : LC50 = 1250 mg/ℓ 96 hr
 - Crustaceans : LC50 = 5.4 mg/ℓ 96 hr
 - Algae : NO DATA
 - Kaolin
 - Fish : NO DATA
 - Crustaceans : NO DATA
 - Algae : NO DATA
- B. Persistence and degradability
- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - Persistence : NO DATA
 - Degradability : NO DATA
 - Titanium dioxide
 - Persistence : NO DATA
 - Degradability : NO DATA
 - Limestone
 - Persistence : NO DATA
 - Degradability : NO DATA
 - Xylene
 - Persistence : NO DATA
 - Degradability : NO DATA
 - Dimethyl carbonate
 - Persistence : NO DATA
 - Degradability : NO DATA
 - S1 (Trade secrets)
 - Persistence : NO DATA
 - Degradability : NO DATA
 - 4-Methyl-2-pentanone
 - Persistence : log Kow = 1.38
 - Degradability : NO DATA
 - Propylene glycol methyl ether acetate
 - Persistence : log Kow = 0.43
 - Degradability : NO DATA
 - Solvent naphtha (petroleum), light arom.
 - Persistence : log Kow = 2.1 ~ 6 (Estimates)
 - Degradability : BOD5/COD = 0.43
 - Ethylbenzene
 - Persistence : NO DATA
 - Degradability : NO DATA
 - Methanol
 - Persistence : log Kow -0.77
 - Degradability : NO DATA
 - 2-Butoxyethanol
 - Persistence : log Kow = 0.83
 - Degradability : NO DATA
 - Kaolin
 - Persistence : NO DATA
 - Degradability : NO DATA
- C. Bioaccumulative potential
- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - Titanium dioxide
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - Limestone
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - Xylene
 - Bioaccumulative potential : NO DATA
 - Biodegradation : 39 (%)
 - Dimethyl carbonate
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - S1 (Trade secrets)
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA

- 4-Methyl-2-pentanone
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - Propylene glycol methyl ether acetate
 - Bioaccumulative potential : NO DATA
 - Biodegradation : Biodegradability > 60 (%) 28 day
 - Solvent naphtha (petroleum), light arom.
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - Ethylbenzene
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - Methanol
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
 - 2-Butoxyethanol
 - Bioaccumulative potential : NO DATA
 - Biodegradation : Biodegradability = 96 (%)
 - Kaolin
 - Bioaccumulative potential : NO DATA
 - Biodegradation : NO DATA
- D. Mobility in soil
- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - ▷ NO DATA
 - Titanium dioxide
 - ▷ NO DATA
 - Limestone
 - ▷ NO DATA
 - Xylene
 - ▷ log Kow = 3.12 (measured) (ortho), 3.2 (measured) (meta), 3.15 (measurements) (p) (5)
 - Dimethyl carbonate
 - ▷ NO DATA
 - S1 (Trade secrets)
 - ▷ NO DATA
 - 4-Methyl-2-pentanone
 - ▷ NO DATA
 - Propylene glycol methyl ether acetate
 - ▷ NO DATA
 - Solvent naphtha (petroleum), light arom.
 - ▷ NO DATA
 - Ethylbenzene
 - ▷ log Kow = 3.15 (11)
 - Methanol
 - ▷ NO DATA
 - 2-Butoxyethanol
 - ▷ NO DATA
 - Kaolin
 - ▷ NO DATA
- E. Other adverse effects
- 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]
 - ▷ NO DATA
 - Titanium dioxide
 - ▷ NO DATA
 - Limestone
 - ▷ NO DATA
 - Xylene
 - ▷ NO DATA
 - Dimethyl carbonate
 - ▷ NO DATA
 - S1 (Trade secrets)
 - ▷ NO DATA
 - 4-Methyl-2-pentanone
 - ▷ NO DATA
 - Propylene glycol methyl ether acetate
 - ▷ NO DATA
 - Solvent naphtha (petroleum), light arom.
 - ▷ NO DATA
 - Ethylbenzene
 - ▷ NO DATA
 - Methanol
 - ▷ NO DATA
 - 2-Butoxyethanol
 - ▷ NO DATA
 - Kaolin
 - ▷ NO DATA

A. Disposal methods : Disposal material should keep in the airtight container, and consign according to Waste Material Management Act

B. Special precautions for disposal : Discard it followed by appropriate regulations Prohibit the unauthorized disposal and incineration due to adversely affect natural ecosystems

14. Transport information

A. UN number : 1263

B. Proper shipping name : Paint (including paint, lacquer, enamel, colorants, shellac solutions, varnish, polish, liquid filler and liquid lacquer sealer) or related materials (including paint diluent and reductant).

C. Hazard class : 3

D. Packing group : II

E. Marine pollutant : N/A

F. Special precautions for user related to transport or transportation measures

○ EmS FIRE SCHEDULE : F-E

○ EmS SPILLAGE SCHEDULE : S-E

15. Regulatory information

○ 4,4'-(1-Methylethylidene)bisphenol polymer with 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis[oxirane]

- Information of EU Classification

▷ Classification : NO DATA

▷ Risk Phrases : NO DATA

▷ Safety Phrase : NO DATA

- U.S. Federal regulations

▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable

▷ CERCLA Section 103 (40CFR302.4) : notapplicable

▷ EPCRA Section 302 (40CFR355.30) : notapplicable

▷ EPCRA Section 304 (40CFR355.40) : notapplicable

▷ EPCRA Section 313 (40CFR372.65) : notapplicable

- Rotterdam Convention listed ingredients : NO DATA

- Stockholm Convention listed ingredients : NO DATA

- Montreal Protocol listed ingredients : NO DATA

○ Titanium dioxide

- Information of EU Classification

▷ Classification : NO DATA

▷ Risk Phrases : NO DATA

▷ Safety Phrase : NO DATA

- U.S. Federal regulations

▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable

▷ CERCLA Section 103 (40CFR302.4) : notapplicable

▷ EPCRA Section 302 (40CFR355.30) : notapplicable

▷ EPCRA Section 304 (40CFR355.40) : notapplicable

▷ EPCRA Section 313 (40CFR372.65) : notapplicable

- Rotterdam Convention listed ingredients : NO DATA

- Stockholm Convention listed ingredients : NO DATA

- Montreal Protocol listed ingredients : NO DATA

○ Limestone

- Information of EU Classification

▷ Classification : NO DATA

▷ Risk Phrases : NO DATA

▷ Safety Phrase : NO DATA

- U.S. Federal regulations

▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable

▷ CERCLA Section 103 (40CFR302.4) : notapplicable

▷ EPCRA Section 302 (40CFR355.30) : notapplicable

▷ EPCRA Section 304 (40CFR355.40) : notapplicable

▷ EPCRA Section 313 (40CFR372.65) : notapplicable

- Rotterdam Convention listed ingredients : NO DATA

- Stockholm Convention listed ingredients : NO DATA

- Montreal Protocol listed ingredients : NO DATA

○ Xylene

- Information of EU Classification

▷ Classification : NO DATA

▷ Risk Phrases : NO DATA

▷ Safety Phrase : NO DATA

- U.S. Federal regulations

▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable

▷ CERCLA Section 103 (40CFR302.4) : 45.3599 kg 100 lb

▷ EPCRA Section 302 (40CFR355.30) : notapplicable

▷ EPCRA Section 304 (40CFR355.40) : notapplicable

▷ EPCRA Section 313 (40CFR372.65) : pertinent

- Rotterdam Convention listed ingredients : NO DATA

- Stockholm Convention listed ingredients : NO DATA

- Montreal Protocol listed ingredients : NO DATA

○ Dimethyl carbonate

- Information of EU Classification

- ▷ Classification : NO DATA
- ▷ Risk Phrases : NO DATA
- ▷ Safety Phrase : NO DATA
- U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA
- S1 (Trade secrets)
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA
- 4-Methyl-2-pentanone
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : 2267.995 kg 5000 lb
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : pertinent
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA
- Propylene glycol methyl ether acetate
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA
- Solvent naphtha (petroleum), light arom.
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA
- Ethylbenzene
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : 453.599 kg 1000 lb
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : pertinent
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA

- Montreal Protocol listed ingredients : NO DATA
- Methanol
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : 2267.995 kg 5000 lb
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : pertinent
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA
- 2-Butoxyethanol
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA
- Kaolin
 - Information of EU Classification
 - ▷ Classification : NO DATA
 - ▷ Risk Phrases : NO DATA
 - ▷ Safety Phrase : NO DATA
 - U.S. Federal regulations
 - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
 - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
 - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
 - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
 - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
 - Rotterdam Convention listed ingredients : NO DATA
 - Stockholm Convention listed ingredients : NO DATA
 - Montreal Protocol listed ingredients : NO DATA

16. Other information

A. Reference

This MSDS is based on 'Industrial safety and health' Act paragraph 41 and Proclamation of Ministry of Labor and Employment 2016-19, and considered domestic regulations.
This MSDS is based on KOSHA, NITE, ESIS, NLM, SIDS, IPCS, NCIS.

B. Issue date : 2010-02-02

C. Revision number and Last date revised : 7.(2019-04-04 오후 2:25:45)

D. Other : " WWW.NOROO.CO.KR"